National Institute of Environmental Health Sciences

The health impacts of heat waves in nine European cities

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Abstract:

Objective: As a response to the 2003 heat wave, a pan-European project was conducted with the aim to improve public health responses to heat waves (EuroHEAT). Materials and Methods: In this context, the impact of heat waves in terms of total and cause-specific mortality was investigated including data from 9 European cities (Athens, Barcelona, Budapest, London, Milan, Munich, Paris, Rome, and Valencia) referring to the period 1990-2004. City-specific analysis by gender and age-groups (65-74, 75-84, 85+) was performed for the summer months (June-August). Heat wave was defined as a period of at least 2 consecutive days with maximum apparent and minimum temperature above the 90th percentile. Different heat wave characteristics, such as duration, intensity, and the time interval between 2 consecutive heat waves were also considered. For all cities a common GEE model was applied, using daily counts of deaths as outcome variable and heat wave as exposure variable. Results: Spatial heterogeneity between cities of the effect of heat on health was found, with percent increase in total mortality varying between +5.9% (in Valencia) and +30.0% (in Milan) for all ages and both genders. Moreover, heat waves of longer duration and higher intensity increased the risk of dying up to 3 times, whereas a higher impact of the first heat wave of the summer was observed only in several cities. The results of cause-specific analysis indicate that the risk of dying from respiratory causes was up to 3-fold the risk of total mortality, with percent increases ranging between 14.2% and 94.8%, whereas the results for cardiovascular mortality were only slightly higher than for total mortality. The effect of heat waves increased with increasing age, and the highest effect was observed among females. Conclusions: The present analysis provides a quantification of the impact of heat waves on mortality, taking into account different heat wave characteristics. Applying a standardized approach allows for a direct comparison between different European cities.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Temperature

Temperature: Extreme Heat

Geographic Feature:

resource focuses on specific type of geography

Urban

Geographic Location: ☒

resource focuses on specific location

Non-United States

Non-United States: Europe

Health Impact: ☒

specification of health effect or disease related to climate change exposure

Injury, Morbidity/Mortality, Other Health Impact

Other Health Impact: heat related morbidity and mortality

Resource Type: ☒

format or standard characteristic of resource

Research Article

Timescale: ☒

time period studied

Time Scale Unspecified